



Evolutionary Perspectives on Pregnancy

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***Evolutionary Perspectives on Pregnancy.* By John C. Avise. New York, NY: Columbia University Press (2013). Pp. xvii+326. Price xxx hardcover.**

Pregnancy is the most intimate of all intraspecific relationships. One individual lives within the body of another, sharing every breath that its mother takes and every meal that its mother eats (at least in groups with well-developed placentas). Discussion of pregnancy is not typical in the pages of *Animal Behaviour* which are more concerned with events leading up to conception and parent-offspring relations after offspring are born. In my contentious moods, I have suggested that the obsession with mating behavior and the relative neglect of pregnancy reflects the interests and concerns of male biologists who are more interested in the transient relation of copulation, the question of who gets to put his thingamajig into her whatsit, than the much more durable and complex relationship of pregnancy. This is perhaps a little unfair. Behavioral ecologists and ethologists have traditionally studied externally observable behaviour whereas pregnancy falls into the domains of anatomy, physiology, endocrinology, and the like. The ethos of ethologists has been to observe with minimal intervention whereas the events of pregnancy are hidden, with methods of study that are often intrusive and destructive.

For almost twenty years, I have taught an undergraduate course on Vertebrate Viviparity as an effective way to teach evolutionary biology in the context of fascinating natural history, with an emphasis on inclusive fitness and evolutionary game theory. Students have often asked me if there was a good introductory book that covered the course's content and I have had to tell them that there was no such book and they would have to read papers scattered through the scientific literature. Now I can point them in

the direction of John Avise's engaging and beautifully illustrated book, a book that is written at a level suitable for a general audience, including college students and the interested lay reader.

Avise reviews the multiple origins and diverse forms of pregnancy and pregnancy-like phenomena in vertebrates, invertebrates and even plants, although he has a particular focus on mammals and fish. I remember inspecting my leg after a boyhood tramp through the Australian bush and finding a large blood-bloated leech surrounded by a swarm of tiny leeches. Was this a litter of leeches or had the smaller leeches merely been attracted to the scent of blood at the incision made by the larger leech? Probably the latter, because live-birth is unknown among land leeches, but I learn from Avise's book that freshwater leeches show well-developed parental care and that one species, *Marsupiobdella africana*, gives birth from an internal brood pouch.

We are told about the late lamented gastric brooding frog of Australia, now sadly extinct, in which females swallowed newly-fertilized eggs and burped forth fully-formed froglets; or the South American *Rhinoderma darwinii* (Darwin's frog) in which males 'gestate' eggs and larvae in their vocal sac; about monozygotic quadruplets in armadillos and the sharing of a common blood supply by dizygotic twin marmosets. Foetal nutrition in viviparous sharks ranges from reliance on yolk deposited in an embryo's own egg, to eating trophic eggs that a mother continues to ovulate during pregnancy, to intrauterine embryonic cannibalism. Other sharks have placentas whereas the foetuses of rays drink 'uterine milk'.

Not only does Avise survey the taxonomic diversity of pregnancy but he also considers its evolutionary biology. Why should males become pregnant in pipefish and seahorses but females carry the offspring in other fishes? How is parent-offspring conflict

and sibling rivalry expressed prenatally? What are the implications of pregnancy for paternity uncertainty (and maternity uncertainty)? I can recommend this book for a reader looking for an accessible introduction to this fascinating subject.

David Haig

Department of Organismic and Evolutionary Biology,

Harvard University,

Cambridge Massachusetts 02138, U.S.A.